

# Practice Tongue CUP Examination to Reveal Systemic Health Disturbances Importance of Tongue Examination in Clinical Diagnosis for Primary Health Care Providers

Suresh Kishanrao

Public Health Consultant and Family Physician, Bengaluru, India.

\*Corresponding Author: Suresh Kishanrao, Public Health Consultant and Family Physician, Bengaluru, India.

Received Date: September 06, 2024 | Accepted Date: October 21, 2024 | Published Date: November 01, 2024

**Citation:** Suresh Kishanrao, (2024), Practice Tongue CUP Examination to Reveal Systemic Health Disturbances Importance of Tongue Examination in Clinical Diagnosis for Primary Health Care Providers, *International Journal of Clinical Reports and Studies*, 3(6);

DOI:10.31579/2835-8295/081

**Copyright:** © 2024, Suresh Kishanrao. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract

This article refers to the value of the routine examination of the visible oral tongue. The oral tongue is moist & pink with neither localized nor diffuse discoloration or ulceration. Filiform, fungiform, and circumvallate papillae are visible with a thin coat. The tongue functions to assist in taste, mastication, deglutition, and speech.

Tongue diagnosis is recommended in most systems of Medicine like Allopathic, Traditional Chinese (TCM), Japanese Kampo (traditional herbal) -JKM), Traditional Korean (TKM) and Indian System of Medicine (ISM).

All Clinicians (doctors & Nurses) must use tongue depressors during a general physical examination to depress the tongue to see the mouth and throat. Without the use of a tongue depressor, the tongue is likely to drift and obstruct the clinician's view. The tongue is first examined within the oral cavity and then have the patient protrude the tongue and briefly repeat the same examination. Must confirm the presence of all three types of lingual papillae and observe for unusual size or coat in the posterior two-thirds of the oral tongue. The thickness of this coat is largely dependent upon the balance between the rate of production of epithelial cells and the rate at which the dead ones are worn away by activity such as eating and talking. Search for any areas of ulceration or discoloration. Specialized techniques beyond the physical examination are necessary for evaluation of taste. If a disease interferes with the proliferation of cells, the hydrated dead epithelial cells of the tongue will not be replaced as fast as they wear off and there will be no coat. If cellular proliferation is normal but the usual removal processes decrease, there will be a thick coat.

**Materials and Methods:** This review is based on experience of the author in the diagnostic and screening value of illnesses, quoting anecdotes spread over 60 years in individuals and community Survey and review of literature about the importance of tongue examination in different systems of Medicine.

**Outcome:** This review recognises the tongue diagnosis as an important diagnostic procedure that is used in all most all health systems helpful in predicting, nutritional deficiencies, infections, neurological issues, and even cancers and seek appropriate investigation in the current time.

**Keywords:** stuttering; adults; reading problems; schizophrenia; morphophonological approach; phonology

## Introduction

The tongue functions to assist in taste, mastication, deglutition, and speech. A physical examination of the oral tongue is crucial in a general physical examination for medical and nursing students as it provides valuable insights into a patient's overall health. The oral (anterior two-thirds of the) tongue is moist & pink with neither localized nor diffuse discoloration or ulceration and visible filiform, fungiform, and circumvallate papillae with a thin coat. Each type of papilla houses taste buds that convey the different tastes of sweet, sour, bitter, and salty. It reveals signs of nutritional deficiencies, infections, neurological issues, and even cancers. Observing the tongue's appearance, texture, and movement, makes it a non-invasive very informative tool for diagnosis. Specialized techniques beyond the physical examination are necessary for evaluation of taste [1].

For examination of the tongue i) first one must examine the tongue within the oral cavity. Confirm the presence of all three types of lingual papillae. Check carefully for unusual size or coat. The coat is evaluated in the posterior two-thirds of the oral tongue. Search for any areas of ulceration or discoloration ii) Then have the patient protrude the tongue and briefly repeat the same examination and evaluate the range of anterior tongue thrust [3]. Medical and Nursing students are taught early in their clinical postings to look for i) Colour: Redness, pallor, or unusual discoloration ii) Surface texture: Smoothness (atrophy), fissuring, presence of papillae iii) Size and shape: Swelling (macroglossia), asymmetry, indentations from teeth, and Mobility: Difficulty moving the tongue, deviation to one side etc. v) Lesions or masses: Any visible abnormalities, ulcers, or palpable lumps during the

general examination of every patient and community screening for Anaemia, Vit Deficiencies and Jaundice. Even in Continued education the tongue examination of a patient is reemphasized to be of utmost importance in the diagnosis of a disease. The methods of examination of patients are slightly different in various countries/ systems, but a few of the basics are somewhat similar [1,2].

Tongue diagnosis is recommended in most systems of Medicine like Allopathic, Traditional Chinese (TCM), Japanese Kampo (traditional herbal) -JKM), Traditional Korean (TKM) and Indian System of Medicine (ISM). All these systems define that a normal tongue has a light red or pinkish body with a thin white coating and recommend drawing inferences based on its colour, coating, taste etc. In Indian Ayurveda system, Homeopathy, Siddhi Systems too, tongue examination is a part of 8-fold examination method, assessed by three examination methods i.e. Darshan (Inspection), Sparshan (Palpation) & Prashna (Interrogation).

While a smooth, atrophic tongue can indicate deficiencies in vitamins like B12 or mineral iron, its dryness, fissuring, or discoloration, point to dehydration, anaemia, and even liver disease respectively. Assessing tongue movement and symmetry provides clues regarding potential neurological issues of cranial nerves involved in tongue function.

In this review, the author has tried to impress the importance of tongue examination, looking for the most common attributes of tongue that give clues for diagnosis. Use of tongue examination along with other methods like interrogation, Pulse reading, BP Recording, Palpation of the abdomen, percussion of the chest clinches the diagnosis in most of the diseases and are basis of most experienced clinicians in India.

### Case Reports:

**1.Tongue Aphthous Ulcer:** Mrs Vandana aged about 56 years presented with an aphthous ulcer on the left posterior-lateral side of the back one-third of her tongue with a painful swelling under the same side jaw and pain on opening the mouth. This was for the third episode in last 6 weeks. On inspection there was an aphthous ulcer of about 1 cm diameter and sub-mandibular lymphadenopathy. She was prescribed Quadra gel for topical application & Becosules capsules (aid tissue repairs) once a day. She recovered in three days.

### 2.Tongue Pallor (oldest clinical Anaemia screening & tool):

Individual Case in 1968: In the beginning of authors career, the only tool we had in our Primary health centre of remote district Kalburgi, Karnataka was clinical examination of the tongue, lips, conjunctiva and Nails. We didn't have even a simple haemoglobinometer, despite having a bedside laboratory. Most often our clinical diagnosis was correct in moderate & sever anaemic cases, we missed about 15-20% of mild anaemia cases.

Tongue Pallor for screening Anaemia in school children: 1. First even Screening of Govt. High School children situated next to our PHC was in early 1969. Screening of 650 children in 6-16 age group was done with the help of ANMs and Lab Technician. The accuracy of clinical assessment was around 82%. Most recent in 2022 KSRDPRU, Gadag, Karnataka's study of about 7000 primary school children (6-14 years) found 66% of (boys=50% & girls =70%) found anaemic by checking tongue pallor. A sub-sample estimation of Hb% on site, it was confirmed that pallor was accurate in more than 80% cases in general. Anaemia was more prevalent in the lower classes (1, 2, 3 classes -6-9 yrs old) and the highest prevalence was in 8th (13-15 yrs) class girls most of whom had menarche. (quoted as the advisor of the study)

**Tongue Examination for Dehydration:** Clinical assessment of dehydration is based on symptoms of thirst, dryness of the tongue, and sunken eyes in all cases of diarrhoea more significantly among children as they lose body fluids very fast.

### Tongue Examination for Diagnosing Enteric fever cases:

In 1969, where a dozen high school children were diagnosed as enteric fever cases based on low-grade fever to start with, that increased progressively to

form a stepladder pattern of rising temperature, relative bradycardia, Hepatomegaly, Splenomegaly, Tender abdomen & Loose motions in School children in a span of 4 weeks and managed with Chloromycetin 500mg capsule every 8 hourly. The most recent case was in July 2024 A 22-year-old man with complaints of continuous fever with chills for six days, headache, anorexia, malaise, abdominal discomfort & diarrhoea. On examination he had coated tongue and slightly enlarged liver. I made a clinical diagnosis of enteric fever, did a rapid test that was positive and sent the sample blood for a blood culture, that was reported for Salmonella Typhi.

**Tongue diagnosis of Vitamin deficiency:** In the early years of service in early 1968-70 most of the PHC medical officer in a remote district used to observe the tongue of school children and women highly tender and sensitive to spices called as Atrophic Glossitis, which was associated with a lack of folic acid, iron, riboflavin, vitamin B12 and responded well to B complex tablets (in UNICEF kits).

### Discussions:

Human tongue is a muscular organ in the mouth that aids in chewing, speaking and breathing. It's a digestive organ, that moves food around the mouth to help chew and swallow. It also helps humans make different sounds so that one can form words & speak clearly. It also helps to keep our airway open to breathe properly [4].

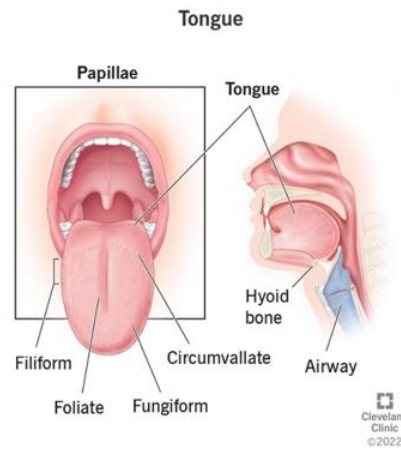
**Anatomy:** Our tongue runs from hyoid bone, located in the middle of our neck to the floor of the mouth. Tongue is mostly made of muscles and is anchored inside the mouth by webs of strong tissue, and it's covered by a moist, pink lining mucosa, that covers certain other organs & human body cavities. The tongue is also covered with different types of papillae and four types of taste buds, namely i) Filiform papillae that are thread-like in appearance - Located on the front two-thirds of the tongue, and they don't contain taste buds ii) Fungiform papillae are mushroom-like in shape located mostly on the sides and tip of our tongue, and consist of approximately 1,600 taste buds iii) Circumvallate Papillae are small bumps on the back of our tongue, are larger than the other types of papillae, and contain approximately 250 taste buds iv) Foliate Papillae located on each side of the back portion of our tongue, look like rough folds of tissue, are about 20 in each person which contain several hundred taste buds. Our taste buds are clusters of nerve cells that transmit sensory messages to our brain. There are five basic tastes that stimulate our taste buds, namely Sweet, Salty, Bitter, Sour and Savory. All our taste buds can detect all five flavours, though some regions of the tongue are just slightly more sensitive to certain tastes in contrary to common misconception that different areas of the tongue taste different things. A healthy tongue is typically pink, but the shades of light & dark can vary [4].

### Tongue Care:

Our tongue is as unique as we are, there's no other tongue quite like it. Taking good care of the tongue keeps it healthy and reduces the risk of harmful oral bacteria. Practicing good oral hygiene is the only way to keep tongue healthy. When we brush and floss your teeth, clean the tongue also. Giving our tongue a few gentle brush strokes, brushing from the back of the tongue forward. Do not scrub. This removes bacteria and freshens the breath. After brushing your teeth for two to three minutes, rinse your mouth with water. Quitting smoking, drinking plenty of water and eating a balanced diet help keep our tongue healthy. The best way to clean our tongue is to use the toothbrush or a tongue scraper and clean the tongue up and down and side to side. Then, rinse the mouth out with water. As mouthwashes only kill the outer cells of biofilm covering the surfaces of mouth, and tongue, it's better to physically rub & remove bacteria with a toothbrush or tongue scraper [4].

### Tongue Examination Process:

Allopathy Medicine recommends examination of the tongue after history taking and checking pulse, i) first examine the tongue within the oral cavity. Confirm the presence of all three types of lingual papillae. Check carefully for unusual size or coat in the posterior two-thirds of the oral tongue. Search for any areas of ulceration or discoloration ii) Then have the patient protrude the tongue and briefly repeat the above examination and evaluate the range of anterior tongue thrust by following the steps below:



**Family Physicians must Observe the following in Tongue for Diagnosis.**

All doctors must use tongue depressors during a medical physical examination to depress the tongue to see the mouth and throat. Without the use of a tongue depressor, the tongue is likely to drift and obstruct the clinician's view.

1. Have the patient touch the tip of the tongue to the roof of their mouth & inspect the ventral surface.

2. Have the patient protrude the tongue straight out and inspect for deviation, colour, texture, and masses
3. With gloved hands, hold the tongue with gauze in one hand while palpating the tongue between the thumb and index finger of the other, noting masses and areas of tenderness.

The tongue exam can reflect several underlying diagnoses such as infections, nutritional deficiencies, malignancy and even neurological dysfunction.



**Figure 1: Tongue Examination**

**A discoloured tongue indicates a health problem [3].**

A cross-sectional study of 1,143 (M=562, F=579) dental outpatients above 18 years of age who visited the Department of Oral Medicine and Radiology between October 2021 to February 2022, reported that tongue lesions were positive in 66.5% of the study population. Coated tongue (26.2%) was the

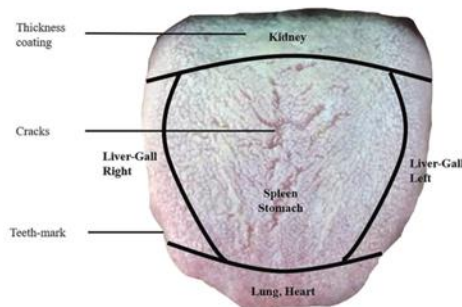
most frequent structural abnormality, and Functional abnormalities was noted in 8.7% of the patients. Taste dysfunction (4.6%) was the most frequent functional abnormality. The lesions were mostly in the anterior two-thirds (4.2%) of the tongue. Careful and detailed evaluation of the tongue examination is mandated in routine dental checkups [4].



**Figure 2: Common presentations of the Tongue on examination & Suggestive of Conditions**

### Tongue Examination in TCM:

The practice of tongue examination as a diagnostic method originated in China during the Jin and Yuan Dynasties (1115–1234). The first work on tongue diagnosis was *Ao Shi Shang Han Jin Jing Lu* written in 1341 and published in Japan in 1654. In Traditional Chinese Medicine (TCM) the clinical diagnostic process is described in four sections- i) Looking: complexion, eyes, tongue, nails, hair, gait, stature and affect. ii) Hearing and Smelling: sound of voice and breath, odour of breath, skin. iii) Interrogation/asking, iv) Touching: palpation & pulse counting. It believes that Stomach affects tongue coating: 1. Tongue coating or "fur" is formed by some "turbid dampness" that is a by-product of the stomach's rotting and ripening activity. This dirty dampness rises to the tongue to form the coating. 2. Thin white coating on tongue is indicative of Stomach functioning



**Tongue examination in Japanese Kampo medicine (JKM):** JKJ is based on traditional Chinese medicine. Kampo medicine trains physicians to look at the shape of the tongue, which is believed to reflect the status of the body's organs, Qi, and Blood. The coating on the tongue is made up of bacteria, food residue, mucus, and exfoliated cells. A thin white coating is considered normal, while a thick white coating may indicate a cold, a yellow coating may indicate heat, and no coating may indicate a deficiency in Ki (Qi) and Ketsu. A dry coating may indicate a yang state, while a wet coating may indicate a yin state. Tongue examination was studied extensively in Japan during the Edo period (1603–1868). The normal colour of the tongue body is defined as light red in Kampo medicine. A, pale, red, deep red, and purple tongue colours indicate deficiency and cold, heat, advanced heat, and blood stasis, respectively [7].

**Tongue examination in traditional Korean medicine (TKM):** Tongue examination in TKM involves observing the tongue's colour, shape, coating, and movement to assess the health of internal organs. It believes that in particular, tongue coating thickness (TCT) is deemed to show the progression of the disease [8].

### Tongue Examination in Ayurveda System:

Ayurvedic practitioners in India use tongue diagnosis to examine a patient's health and identify body's imbalances. The tongue is inspected for size, shape colour, coating. There are three main examination methods i.e. Darshan (Inspection), Sparshan (Palpation) & Prashna (Interrogation). In the 8-fold examination of general built, Pulse, Tongue, Eyes, Palpation, Sound, Urine, and Faecal matter, examination are key approaches. Tongue examination is a part of 8-fold method [9].

Homoeopathic prescriptions based on tongue: The tongue is a very important organ of the body is representing the different types of digestive systems and physiological activities of the of various organs. The location front of the tongue is related to upper GI tract, lungs, and heart; The Middle part of the tongue relates to liver, spleen, and stomach; The back is associated with the large intestine and kidneys; The very tip is the location of thyroid and vertical line in the middle of the tongue represents the spine. The general plan of

properly. No coating or peeled coating means Stomach's digesting function is impaired, and Stomach Qi & Yin is weakened. If Stomach fluids are abundant, digestion will be good, sense of taste will be normal, on the contrary deficient stomach secretions (Stomach Yin) indicated poor digestion, thirst, dry, cracked tongue. The Six Excesses and their characteristic clinical sign is a white tongue with fur, deep & hidden. Red tongue, yellow tongue fur, indicate fever 4. Greasy tongue fur with sensation of heaviness, or fullness, is a symptom of Spleen dysfunction [6].

In the TCM theory, the tongue has connections to the conditions of organs and body fluids, as well as the degree and progression of the disease. The main features used in tongue diagnosis are colour and coating. For example, the normal tongue is red with a thin white coating [6]

clinical examination & assessment includes observing Size and shape, Condition- congenital /acquired, Pale/pink, Dry/moist- and salivation, Papillae, Indentation, Discolouration, Pigmentation, Temporary like cyanosis, Coating, Suppuration, Gangrene, Eruption, Growths- including warts, cancer and ranula, Varicosity of veins, Movement- including paralysis, Inflammation, excoriation, and exfoliation etc. It reflects the digestive disorders. It also gives a useful information about the primary affection of some other organs. A cyanosed tongue points to impure oxygenation resulting from cardio-pulmonary affections [10].

### Tongue Examination in Siddha System:

In Siddha system, diagnostic method is about identifying the disease and their causes. This is one of the oldest diagnostic modalities used for assessing an individual's current state of health. Three approaches followed in this system include i) Examination through the physicians' sense organs (Poriiyal Arital), ii) Examining the patients' sensory functions (Pulan Arital) and iii) Examination by interrogation. Siddha system of Medicine also uses eight types of Examination methods Naadi (pulse), Sparsam (palpation), Naa (tongue), Niram (body complexion), Mozhi (speech), Vizhi (eye), Malam (stool), and Neer (urine). Tongue examination is supposed to be candlelight to diagnosis by observing the Colour, Surface, Coating, Ulcers Size, Sputum, Palate, Shape, Moisture, Movements, Deviation, Taste sensation etc. Scientific validation for disease like Eri Gunmam /Acid peptic disease, Bronchial Asthma, Haemorrhoids etc. stand valid even today [11].

### Allopathic pathological descriptions of the tongue [5]:

1. **Smooth Tongue:** The most common cause of a smooth tongue is the use of dentures, nutritional deficiencies of iron, folate and vitamin B12 deficiency. B12 deficiency will also make the tongue sore and beefy-red in colour. Glossitis, by causing swelling of the tongue, may also cause the tongue to appear smooth. Among women, low-oestrogen states may cause a "menopausal glossitis".





Figure.3 Smooth tongue stanford25.wordpress.com

2. **Geographic Tongue:** Geographic tongue is a benign condition in which discoloured, painless patches of the tongue appear and then reappear from atrophy, often in a different distribution.

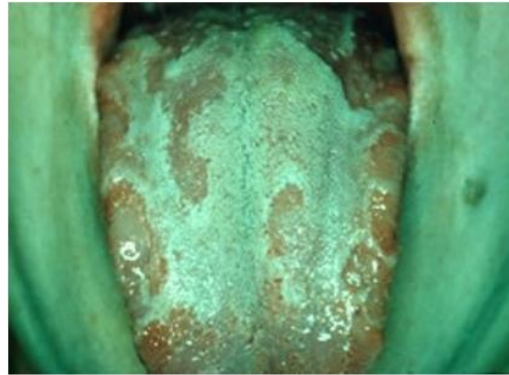


Figure .4 Geographic Tongue

3. **Hairy Tongue:** White hairs along the sides of the tongue are the classic appearance of oral hairy leucoplakia, the result of EBV infection in HIV-positive individuals. A black hairy tongue in the setting of chronic administration of Penicillin's is often fungal overgrowth, particularly of aspergillus.



Figure.5 Hairy Tongue, Stanford25.wordpress.com

4. **Tongue Pallor:** Comparison of examination of conjunctivae, tongue, palms and nailbed for pallor with the reference standard (haemoglobin estimation) reported that the tongue pallor outperformed other pallor sites and was also the best discriminator of anaemia at haemoglobin thresholds of 7 g/dL and 9 g/dL with an accuracy and reliability of 84% [11]



Figure 6. Black Hairy Tongue

**Furrowing:** Transverse furrows across the tongue may be from a benign condition called scrotal tongue. Furrows that are longitudinal along the length of the tongue are the result of syphilis [5,6]

**Ulcers:** In inspecting ulcers, it is important to note their size, number, colour, distribution, and any discomfort caused to the patient.

1. Aphthous ulcers, or aphthous stomatitis, are a painful form of ulcer that is frequently encountered. Anyone can get an aphthous ulcer; 20% of the population have one or more, occasionally. They usually



Fig.7. Aphthous Ulcer

2. Recurrent aphthous ulceration or stomatitis (RAU/RAS): Recurrent aphthous ulcers (canker sores) begin in childhood or adolescence, with peak onset in persons aged 10-19 years. Major aphthous ulcers (canker sores) begin soon after puberty. Frequency and severity diminish with age. Usually point to some systemic illnesses like Crohn's Disease and Ulcerative Colitis, Behcet's Syndrome,

first appear in childhood or adolescence, and more commonly affect females than males. It can be minor, major, or herpetiform. Minor aphthous ulcers are usually 2-8 mm in size and spontaneously heal within 14 days. Major aphthous ulcers are >1cm in size and may scar when they heal. Herpetiform ulcers are pin-point size, often multiple, and may coalesce to form a larger ulcer. Odynophagia is a condition when they occur toward the posterior surface of the oropharynx.

Pemphigus, Herpes simplex, Histoplasmosis, and Reiter's Syndrome. If the ulcers become infected, require treatment.

Oral Cancer: A single non-healing, erythematous, painful ulcer suggests lingual or oral cancer, in the patient who uses tobacco and/or alcohol.

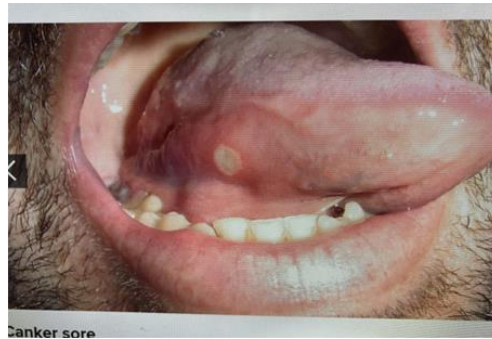


Fig.8 Canker Ulcer

### 3. Covid Related Tongue Ulcers:

Since 2020 during Covid 19 Pandemic, more than half the patients presented with nonspecific mouth ulcers accompanied by tongue inflammation, discoloration and loss of taste sensation. Definite cause or mechanism is yet to be understood but one study suggested that the virus doesn't directly damage olfactory sensory neurons, but some researchers are still trying to determine how and why the COVID-19 virus affects taste & smell.

#### Treatment for Aphthous Ulcers:

- i) Topical Jels: A person can apply topical hyaluronic acid (0.2%) or a product called Quadrajel (contains Lidocaine (2% w/w) + Chlorhexidine Gluconate (1% w/w) +

Metronidazole Benzoate (1% w/w) which acts as Antiseptic, Analgesic, Astringent and Demulcent) or topical corticosteroids Jel to reduce inflammation, directly to the sore using clean hands. They act as a barrier between the sore & rest of the mouth.

- ii) Supplements: Supplements, like arginine, vitamin C, and lysine, help to heal canker sores. Researchers suggest 3-5 grams (g) of arginine a day or 3-4 g of vitamin C taken over a day.
- iii) Antiseptic mouthwash: mouthwashes, that contain tetracycline antibiotics or chlorhexidine.



**Figure.8 Covid 19 related Tongue Sores**

**Fasciculations:** Fasciculations of the tongue are indicative of lower motor neuron injury, present with dysarthria or dysphagia. New onset fasciculations are due to amyotrophic lateral sclerosis.

**Lingual Cancer:** Lingual cancer is the second most-common head and neck cancer, after that of the labia. Tobacco and alcohol use are both major risk-factors. The patient will often present with a painful mass in the tongue or a non-healing ulcer. There may be a history of leucoplakia, dysphagia, or dysarthria. Physical exam may reveal a tender lump in the tongue on palpation. A proper workup, which may include fine needle aspiration of the mass, is necessary for diagnosis.

**Candidiasis (Thrush on tongue):** Oral candidiasis, or thrush, is the result of infection of the oropharynx by *Candida albicans*. This is seen in patients with immunocompromise, like HIV, diabetes, or chronic antibiotic use, leading to fungal overgrowth. The patient presents with painless, white plaques on the tongue or oropharynx which are easily scraped off. Treatment includes antifungals, and a nystatin gargle.

**Tongue examination in Enteric fevers:**



**Figure.8 Thrush on tongue**

**Examination of Tongue Pallor:** Most health providers in resource poor settings rely on physical signs to diagnose anaemia. Since time immemorial Indian Medical and nursing students in India are taught Identifying pallor in conjunctiva, tongue and nails. Detecting pallor in a community screening is a dependable sign of anaemia. The tongue surface pallor is a strong signal of severe anaemia in female patients whereas conjunctival pallor is a good indicator for mild and moderate anaemia [11]. KSRDPRU, Gadag, Karnataka's study in 2022 in about 7000 primary school children (6-14 years) found 66% of (boys=50% & girls =70%) found anaemic by checking tongue pallor. Among a sub-sample of children with tongue Hb% was examined, and it was found that clinical assessment was accurate in more than 80% cases. Anaemia was more prevalent in the lower classes (1, 2, 3 classes -6-9 yrs old) and the highest prevalence was in 8th (13-15 yrs) class girls most of whom had menarche. (report under publication)

**Tongue signs of Micro-nutrients deficiency (Vitamins & Minerals):**

A coated tongue is a common and powerful marker for enteric (Typhoid) fever, that primary care physicians use in rural India. Until 1990's our diagnosis was based on clinical examination of tongue for a coat and other symptoms i) Low-grade fever that rises progressively to form a stepladder pattern of rising temperature, Relative bradycardia, Headache, Hepatomegaly, Splenomegaly, Tender abdomen, Loose motions in children or Constipation in adults. A study found that a coated tongue has a specificity of 84.71% for diagnosing enteric fever. Another study reported that coated tongue and slightly enlarged liver had a higher predictive value to the tune of 97%. Only in Mid-1980's we started complementing with Widal tests and on after 2000 blood culture was used to confirm the diagnosis in Urban India. A widal test is a quick and easy blood test that helps to confirm or rule out typhoid fever, even when the symptoms are mild, but the test done between 6 to 30 days of the initial signs of fever, after exposure to the infection, therefore the test is prescribed after 1st week of symptoms. This approach remains mainstay in rural areas and general practice even today but is complemented by Widal Test, Rapid Diagnostic Kits (RDKs) and Blood culture for organisms in cities these days. The three main RDT tests and variants with moderate diagnostic accuracy since 2017 in India. More robust evaluations of alternative RDTs for enteric fever are needed.

- i. A sore, beefy-red tongue. also swollen sometimes with burning sensation, discoloration, and lesions in the mouth and sometimes a pale tongue is suggestive of Vitamin B12 deficiency.
- ii. A painful, magenta-colored, smooth tongue is indicative of Riboflavin (vit B2) deficiency.
- iii. A shiny, smooth tongue with atrophied papillae is suggestive of Folate (B9 or folic acid) deficiency:
- iv. A raw beefy, bright red, swollen, and painful tongue is indicative of Niacin (Vit B3) deficiency.

#### **Other Tongue Conditions and Disorders described in Allopathy:**

1. Difficulty in moving the tongue: Tongue movement issues are due to nerve damage. As the nerve damage makes the muscles that control the tongue weak or paralyzed.
2. Tongue-tie (ankyloglossia): In this condition, the frenum, the band of tissue that connects the tongue to the floor of your mouth is too short, making it difficult to move the tongue freely and

have a negative impact on speech. In babies, this can cause breastfeeding problems. A frenectomy is the treatment of choice for this.

3. Changes in taste: Dysgeusia (a change) and ageusia (a total loss) of taste are caused by infections (Covid 19 in the recent years), nerve problems, certain medications or damage to taste buds.
4. Numb tongue: Tongue numbness is a symptom of a) An allergic reaction to certain foods or chemicals b) Autoimmune disorders, such as lupus, scleroderma or multiple sclerosis (MS), c) Raynaud's phenomenon, a condition in which our small blood vessels constrict, d) Nerve damage, which may occur after dental work or a tongue piercing and v) A lack of certain minerals and Vitamins calcium, iron, zinc, phosphorus and Vitamin B complex. The worst type of tongue numbness or tingling is a symptom of stroke. If tongue numbness develops in combination with facial droop, difficulty speaking, confusion, dizziness, loss of vision or severe headache, it indicates an emergency condition needing immediate care.
5. Sore, bumpy tongue: Irritations or minor infections are the most common causes of tongue soreness. Smoking, canker sores or ill-fitting dentures and Oral Cancer are the causes this discomfort.
6. **Burning tongue:** A burning mouth syndrome is a condition in which the patients mouth, or tongue feels burnt or scalded. It

isn't harmful but can be uncomfortable. Though it can affect anyone but is most common in postmenopausal women.

7. **Macroglossia (Enlarged tongue):** An average tongue is approximately 3 inches long and about 2.52 inches wide. An enlarged tongue results due to trauma, inflammatory conditions or primary amyloidosis (clumps of abnormal proteins in organs & tissues).
8. **Atrophic glossitis (Bald tongue):** Bald tongue is the commonest condition Indian Family physicians, and it is a symptom of anaemia or a vitamin B deficiency.
9. **Cold sores:** Cold sores are caused by herpes simplex virus. Most often they develop on lips but can appear on our tongue.
10. **Changes in colour:** a) White tongue: White patches on our tongue indicate thrush, lichen planus, leucoplakia etc. b) Red or purple tongue: In India it is a symptom of vitamin deficiencies, scarlet fever or Kawasaki disease and it could be due to geographic tongue. c) Black tongue: If the tongue is yellow, brown or black, it is called black hairy tongue, despite not having hair on it. This condition happens when bacteria, food and other debris build up on our tongue's filiform papillae. d) yellow tongue: A yellow tongue is usually the result of bacterial overgrowth, smoking or eating certain foods or rarely a symptom of psoriasis or, jaundice.



Fig.8 Thrush on tongue

## Conclusion:

The tongue functions to assist in taste, mastication, deglutition, and speech. A physical examination of the oral tongue is crucial in a general physical examination for medical and nursing students as it provides valuable insights into a patient's overall health. Tongue diagnosis is an important diagnostic procedure that is used in all most all health systems. Observing the tongue's appearance, texture, and movement, makes it a non-invasive very informative tool for diagnosis. Clinicians need to first examine the tongue within the oral cavity. Check carefully for unusual size or coat in the posterior two-thirds of the oral tongue. Look for any areas of ulceration or discoloration and then have the patient protrude the tongue and briefly repeat the same examination and evaluate the range of anterior tongue thrust. It reveals signs of nutritional deficiencies, infections, neurological issues, and even cancers. Specialized techniques beyond the physical examination are needed for evaluation of taste.

## References:

1. The Tongue -Clinical Methods: The History, Physical, and Laboratory Examinations,
2. Tongue diagnosis for analysing health and diseases, Madhuri P Bhide, et.al,
3. Examination of Tongue, Bedside Medicine, <https://stanfordmedicine25.stanford.edu/2023>
4. Tongue: Definition, Location, Anatomy & Function, <https://my.clevelandclinic.org/04/24/2022>

5. [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=Structural+%26+functional+abnormalities+of+the+tongue%3A+An+epidemiological+study+from+a+tertiary+care+centre+in+India%2C+Angela+Piplani+et.al%2C+https%3A%2F%2F1000research.com%2F+12-822&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Structural+%26+functional+abnormalities+of+the+tongue%3A+An+epidemiological+study+from+a+tertiary+care+centre+in+India%2C+Angela+Piplani+et.al%2C+https%3A%2F%2F1000research.com%2F+12-822&btnG=)
6. Diagnose your Health with TCM Tongue Diagnosis, Thomson Team, 11/01/ 2023
7. Objective evaluation of tongue diagnosis ability using a tongue diagnosis, in Traditional Kampo (Japanese) Medicine, Makoto Segawa, et.al, Doi: 10.3389/fmedt.2023.1050909, March 2023
8. [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=Availability+of+Tongue+Diagnosis+System+for+Assessing+Tongue+Coating+Thickness+in+Patients+with+Functional+Dyspepsia%2C+Raheleh+Khorasan%2C+https%3A%2F%2Fonlinelibrary.wiley.com%2Fdoi%2F10.1155%2F2013&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Availability+of+Tongue+Diagnosis+System+for+Assessing+Tongue+Coating+Thickness+in+Patients+with+Functional+Dyspepsia%2C+Raheleh+Khorasan%2C+https%3A%2F%2Fonlinelibrary.wiley.com%2Fdoi%2F10.1155%2F2013&btnG=)
9. Tongue diagnosis for analysing health and diseases, in Ayurvedic system Sachin Kulkarni et.al, <https://jchr.org/index.php/JCHR/article/view/1956>, Dec 2023
10. Homoeopathic prescriptions on tongue examination, Dinesh Kumar, <https://www.homeobook.com/04/12/23>
11. Tongue examination in Siddha System, Noi-Naadal, <https://nischennai.org/2020>
12. [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=Accuracy+and+Reliability+of+Pallor+for+Detecting+Anaemia%3A+A+Ashwini+K+et.al%2C+https%3A%2F%2Fwww.researchgate.net%2Fdoi%3A+10.1371%2Fjournal.pone.0008545&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Accuracy+and+Reliability+of+Pallor+for+Detecting+Anaemia%3A+A+Ashwini+K+et.al%2C+https%3A%2F%2Fwww.researchgate.net%2Fdoi%3A+10.1371%2Fjournal.pone.0008545&btnG=)



**Ready to submit your research? Choose ClinicSearch and benefit from:**

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

**At ClinicSearch, research is always in progress.**

Learn more <https://clinicsearchonline.org/journals/international-journal-of-clinical-reports-and-studies>



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.